

Application No. 10/612,878

Docket No.: 2901683.10

REMARKS***Introduction***

Receipt of the Office Action mailed January 18, 2006 is acknowledged. No claims are canceled. Claims 72-75 have been amended to depend on elected claims. Applicant reserves the right to add new claims similar to claims 72-75 that depend from claims 34 and 35 after rejoinder of the nonelected claims. New dependent claim 111 has been added and is directed to a sheet or plate of claim 1 comprising an alloy that is substantially recrystallized and has an equiaxed grain structure. Support for the new claim can be found throughout the specification and claims, for example, in paragraph 45 of the specification. No new matter has been added.

Entry of the amendment and favorable reconsideration of the present application are earnestly solicited.

Election/Restrictions

Rejoinder of the nonelected claims under the *In re Ochiai* guidelines is respectfully urged. The elected claims are believed to be allowable for at least the reasons advanced below. Since the Examiner has submitted that the groups will be rejoined upon allowance of product claims, rejoinder of the withdrawn claims is now appropriate.

Claim Objections

Claims 72-75 were objected to because of informalities: The claims objected to have been amended to now depend on elected claims. Withdrawal of the objection is respectfully requested. .

Specification

With regard to paragraph [0068] of the specification, under well established cannons of claim construction, a claim that recites a singular article requires just one of the element that follows. Thus it is clear that such a claim would also cover more than one.

Application No. 10/612,878

Docket No.: 2901683.10

Claim Rejections - 35 USC § 103

Claims 1-21, 25-33, 36-56, 60-98, 102-110 were rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Heymes et al (US Patent No 6,077,363) in view of Rioja (US Patent No 6,562,154). This rejection is respectfully traversed for at least the following reasons.

The Examiner contends that Heymes teaches a wrought Al-Cu alloy sheet or plate formed of an alloy composition that overlaps the presently claimed ranges of Cu, Mg, Si, Fe, Mn, Ag, and Zr. The Examiner admits that the claimed Zn range is not taught or suggested by Heymes. The Examiner apparently relies solely upon Rioja to provide for the deficiency of Heymes.

However, the proffered combination of references falls well short of rendering the present claims obvious. Rioja does not provide for the deficiencies of Heymes. It was apparently the Examiner's supposition that Rioja's teaching of adding up to 1.0% Zn¹, would supposedly have motivated one of skill in the art to add Zn to Heymes' alloy for the alleged purpose of forming strengthening precipitates (column 5 lines 15-22, at claim 8). Applicants respectfully disagree.

Rioja teaches aluminum sheet products having a highly anisotropic grain structure and a highly textured crystallographic microstructure (Abstract). In this regard, the term "anisotropic microstructure" means "a grain microstructure where the grains are elongated unrecrystallized grains or elongated recrystallized grains with an average aspect ratio of length to thickness of greater than about 4 to 1" (Rioja, column 3 lines 52-56). In fact, Rioja refers to his *comparison* samples as exhibiting equiaxed microstructures (Figures 4a and 4b and column 7 lines 29 to 39 of Rioja). Thus his goal was not to achieve equiaxed grain arrangements, but instead to do just the opposite. To the contrary, having an equiaxed grain structure was a definitive target for alloys of the present invention (see claim 111, for example). Since Rioja teaches that an

¹ In fact, the use of zinc is only mentioned by Rioja among other elements (Ag, Li and Si) as an element that could possibly give rise to strengthening precipitates. The only examples Rioja includes in this regard is Li (770-311, see tables 1 and 4) that shows an Li addition improves Brass-texture. Rioja does not teach replacing Cu, Mg or Mn with Zn..

Application No. 10/612,878

Docket No.: 2901683.10

anisotropic microstructure is essential to Rioja's invention, Rioja, in fact, *teaches away* from the present claims. Products having the composition of instant claim 1 are largely recrystallized, with relatively fine and fairly equiaxed grains (see § 45). This type of structure is completely different from the structure taught by Rioja. One skilled in the art would not apply teachings from Rioja to achieve alloys of the pending application, *inter alia*, because Rioja relates exclusively to products with a different microstructure.

The present invention was directed to the use of a controlled quantity of Zn, which in turn, was unpredictably found to result in metal sheets and plates having approximately the same strength but higher damage tolerance and corrosion resistance than is possible to obtain with metal sheets that do not contain added zinc (§ 41 and §78). Such an effect was not predicted by Heymes or Rioja. The presently claimed invention does not relate to improving strength (Rioja teaches that Zn addition may improve strength), but rather, to achieving improved damage tolerance and corrosion resistance while not significantly reducing, and preferably maintaining strength. Such properties are particularly important with regard to aircraft structural members and particularly for fuselage members comprising AlCuMg alloys (see, e.g. §27 of the pending application). As such, one of skill in the art would not have used the teaching of Rioja about zinc, particularly because Rioja relates to the use of zinc solely to improving strength, not improving damage tolerance and resistance to corrosion.

Moreover, Applicant has shown unexpected results specifically associated with the use of the claimed Zn range. Namely, a side by side comparison was done comparing a plate made from an alloy having substantially no Zn (as in Heymes) with a plate having Zn in the range claimed in claim 1.

Criticality of the claimed Zn range has also been demonstrated. Unlike the teaching of Rioja, no improvement of strength was observed. To wit, Table 2 of the instant specification shows that for a substantially Zn free alloy plate having a 3.2 mm thickness, the tensile yield strength in the TL direction (TYS, or Rp0,2) was 318 MPa, whereas for an inventive Zn containing alloy, the TYS in the TL direction was from 308 and 318 MPa. Indeed, the Zn containing alloy produced a strength that is within the same general range as the strength of a Zn

Application No. 10/612,878

Docket No.: 2901683.10

free alloy. Figure 1 reproduced below illustrates the mechanical strength of four different alloys having varying amounts of Zn.

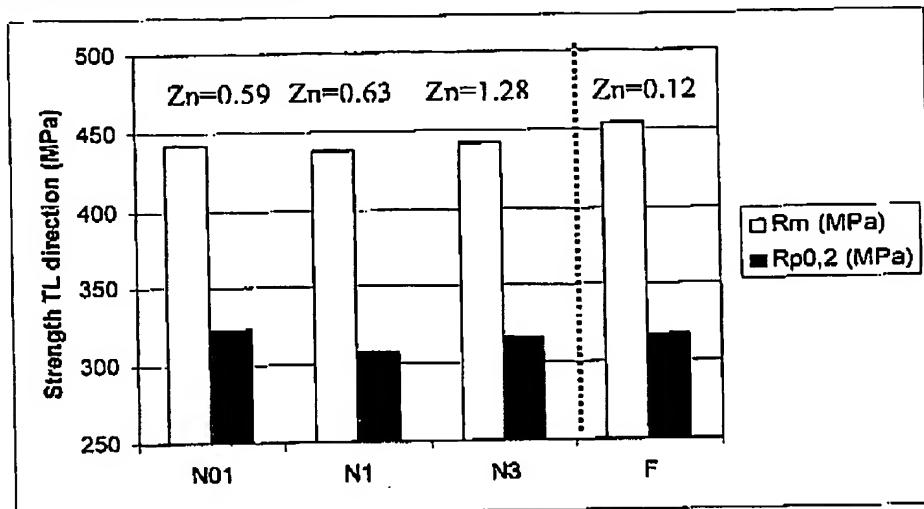
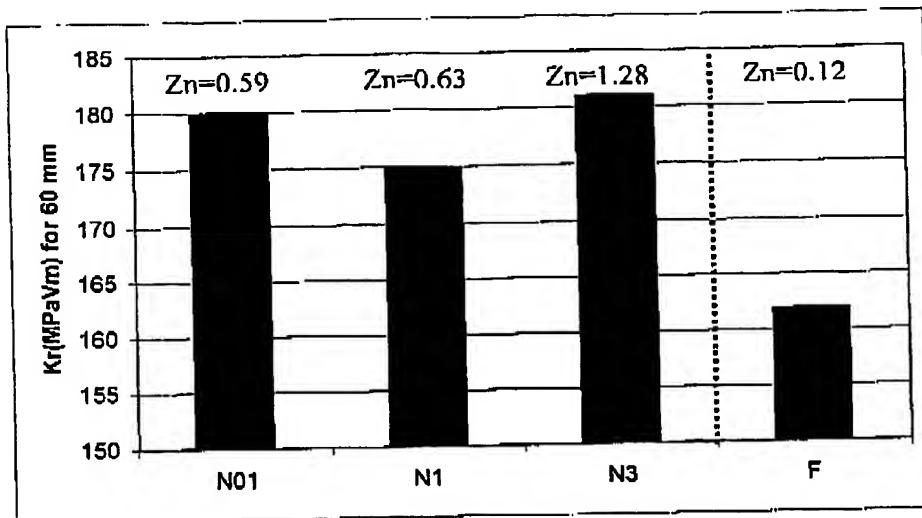


Figure 1 : 1 R_m and R_{p0.2} in the TL direction for a thickness of 3.2 mm

As can be seen in Figure 1, the intentional inclusion of Zn (alloys N02, N1 and N3) did not show any strength increase as compared with the substantially Zn-free alloy (alloy F). However, even though strength did not measurably increase or decrease, the damage tolerance and corrosion resistance were markedly improved. This is illustrated in Figure 2 (data from Table 3), which compares the K_r values of 3.2 mm sheets in the T-L direction for $\Delta a_{eff} = 60$ mm.

Application No. 10/612,878

Docket No.: 2901683.10

Figure 2 K_r values of 3.2 mm sheets in the T-L direction for $\Delta a_{eff} = 60$ mm

Finally, with regard to the claims reciting properties not directly taught by the prior art, it is respectfully submitted that the Examiner's reliance on *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977), and *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990) is misplaced. That is, contrary to the Examiner's assessment, Heymes does not teach "substantially similar processing steps performed on an alloy that falls within the instant alloying ranges." The Examiner has not provided a sufficiently sound basis for believing that the products of the applicant and the prior art are the same. The use of the claimed Zn range of 0.4-1.30 renders the instant products completely different from those of Heymes, and the difference in Zn content is very significant. Thus the Examiner has failed to meet the standard required to shift the burden of proof to the Applicant for these claims. Indeed, the Examiner already admitted that the claimed products and prior art [Heymes] products are NOT identical or substantially identical in structure or composition, at a minimum by virtue of their different Zn contents. No *prima facie* case of anticipation or obviousness has therefore been established with respect to claims that recite properties that are not directly taught by any reference being relied upon by the Examiner.

For all these reasons, it is respectfully submitted that the instant rejection is improper and

Application No. 10/612,878

Docket No.: 2901683.10

should be withdrawn. In view of the above amendment and foregoing remarks, Applicant believes the pending application is in condition for allowance.

For the fee due for the addition of new claim 111, please charge \$50.00 to the credit card listed on the attached form. For any additional fee that may be due or if there is any overpayment by the Applicants, please charge or credit our Deposit Account No. 11-0553, under Order No. 2901683.10, from which the undersigned is authorized to draw.

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Respectfully submitted,
By Susan E. Shaw McBee
Susan E. Shaw McBee
Registration No. 39,294
Kening Li, Ph.D.
Registration No. 44,872
Baker, Donelson, Bearman, Caldwell, & Berkowitz, P.C.
555 11th Street, NW, 6th Floor
Washington, DC 20004
Direct: 202.508.3479
Fax: 202.220.2279
Attorneys for Applicant

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